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## Is Design a Plus?

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# Is Design a Plus? A dilemma of disciplines when implementing design into academic education

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**Abstract:** Universities are increasingly implementing design into their education programmes across the humanities, social science, natural sciences and business schools. Through design, it can therefore be argued that academic education is becoming increasingly interdisciplinary, implementing design along with the given academic discipline's traditional curriculum. With design moving into other disciplines and schools of thought, the question arises as to what types of knowledge contribution can be identified and how can the established schools of thought comprehend a new type of knowledge contribution. In this paper, we will discuss an epistemological dilemma that occurred when implementing design into established humanistic education at Aalborg University, which is a problems-based learning (PBL) university. From our empirical observations, having implemented design into the humanistic curriculum, a series of educational dilemmas arose. We therefore pose, and later discuss, the following question: Can interdisciplinary universities with any fair claim expect their students to both create a constructive design contribution as well as a 'classic' academic contribution – or should the constructive design itself be acknowledged as a knowledge contribution?

**Keywords:** University programme, Design in education, Constructive design research, Design knowledge, Design epistemology

## 1. Introduction

Within the last decade, design has been implemented in various academic education programmes and has proven itself applicable to the established ways of working and suitable for several different subjects. In this paper we understand design as a 'designerly practices' (Buchanan, 1992; Cross, 1982), which refers to the professional designer's way of operating. Here teaching design to students is most successful when the pedagogical model is Project-Based Learning (PBL) (Dym et al., 2005). The process of design has similarities to the PBL approach, as both acknowledge the complexity of framing problems together with employing an iterative and often agile approach to

exploring said problems. The merging of PBL and design has therefore not caused much disputation when it comes to addressing a given problem and methods from the two disciplines have often supplemented each other well.

PBL is built on the idea of problem-orientation as the learning method is based on the principle of using a problem at the outset for learning purposes (Barrows, 1985). In this sense, learning is organised around the problem, but it is not the solution of the specific problem that is the goal, which links back to the characteristics of the addressed problem. A problem addressed in PBL 'should stand as one specific example or manifestation of more general learning outcomes related to knowledge and/or modes of inquiry' (Barge, 2011, p. 7) and is therefore also aimed at developing knowledge with a broader application than could be achieved from the specific case alone. The Danish approach to PBL is additionally routed in teamwork, interdisciplinary cooperation, participant-directed learning and the exemplary principle (Illeris, 1976). Here, there are three central dimensions: the problem, the content and the team (Kolmos et al, 2004), which means that the learning is situated in a specific context and that it is dependent on the interaction between fellow students and other stakeholders.

There are multiple similarities between how students are encouraged to address and solve problems within PBL and how designers address and solve problems. Buchanan has pointed out that designers engage with wicked problems (Buchanan, 1992), which is broadly supported in the literature. The practices of design are, like PBL, contextual, which is evident in many of the design methodologies such as design ethnography (Crabtree, 2001), contextual design (Beyer & Holtzblatt, 1998) and user-centred design (Gulliksen et al., 1999). Design is also concerned with collaboration and negotiation (Bucciarelli, 2001), participatory design (Kensing & Blomberg, 1998) and design facilitation for multiple stakeholders (Sanders & Westerlund, 2011).

From this brief comparison, it is apparent that there are some similarities between PBL and the way designers think and work, which might explain why the implementation of design in PBL-based education is possible and beneficial. However, there is also a key difference when comparing it with traditional humanities projects, or for that matter, with social or natural science projects. In design, the problem framing and solution co-evolve, which means that the problem formulation changes many times during the process and cannot be 'fixed' from the beginning (Dorst & Cross, 2001). According to Owen (2006), science is about correctness, thoroughness and testability. Art is related to insightfulness, novelty and simulation, while design deals with cultural fit, appropriateness and, to some degree, effectiveness. Thus, in terms of fitting classic academic virtues, the continuous framing and reframing of the problem setting meets a core epistemological challenge.

Despite the epistemological challenges of aligning design with the traditional fields of science, the field of design has enjoyed much success in academia in recent years. This has led to an increase in institutions that seek to include design into their practice. This makes design a 'plus', and no longer a discipline in itself, but something another discipline adopts into their practice. In fact, Krippendorff (2005) counted more than 650 different practices that in some way align themselves with those of design and design thinking. This presents us with a paradox. If design can be viewed as an addition to a wide range of practices, is design always a positive addition? Even though its values are aligned with those of the humanities, can we then reasonably claim that design contributes to the knowledge contributions associated with the humanities? In this paper, we focus on how education implements design – how educators train their students to become designers and contribute with design knowledge. According to Owen (2006), science is about correctness, thoroughness and testability. Art is related to insightfulness, novelty and simulation, while design deals with cultural fit, appropriateness and, to some degree, effectiveness.

We have observed a tendency within the students' project work for them to increasingly focus on the design of some broad instance of a 'product' (Buchanan, 2001) and on their design process, and thus to diminish the traditional humanistic-oriented critical analyses and reflections. An analytical knowledge contribution is legitimate in traditional academic settings, whereas the knowledge contribution in design should be generated through the designed 'product'; the frameworks that explain it (Wensveen & Matthews, 2015) and the process that shapes the outcome (source). The weighting of these three potential knowledge contributions is the concrete dilemma. The dilemma is thus rooted in two distinct epistemologies – the classic academia derived from e.g. humanistic and social sciences and the latter from what e.g. Koskinen et al. (2011) label 'constructive design research'.

In this paper, we draw on our experiences from organising and facilitating a module that propositions a designerly approach to PBL. The intention here is to discuss the dilemma and raise questions to facilitate reflection on the matter rather than to provide answers to how design should be implemented in an academic setting and what role it should play.

## 2. Methodology

We engage in critical reflections on current tendencies within parts of academia and leverage the discussion with a case study, based upon our own experiences of planning, executing and evaluating a strategic design-oriented module for masters' students at Aalborg University.

We have chosen to undertake a case-study approach to challenge our preconceived views, assumptions and hypotheses, because we are, as educators, deeply interweaved in the subject area. We believe, with reference to Flyvbjerg, that 'One can often generalize on the basis of a single case, and the case study may be central to scientific development via generalization as supplement or alternative to other methods' (Flyvbjerg, 2006, p. 228). Here, we look for interesting nuances rather than generalisations. As Flyvbjerg (2006, p. 221) argues, only context-dependent knowledge exists in the study of human affairs.

As an empirical ground for this paper, we have concentrated on the formal guidelines from the School and Study Board together with student reports. The latter have been understood and treated as annotated portfolios as a means through which to connect design artefacts and design approaches to theoretical concerns (Gaver, 2012). The collected student reports represents individual design problems, but also represents a portfolio overview of how the dilemma of the design discipline in academic education is represented. It is in this totality we have sought to identify the patterns of the dilemma of disciplines as the paper's empirical material.

## 3. BizChange: A designerly way of learning

The case originates from the School of Communication, Art and Technology within the Humanistic Faculty, Aalborg University. The education is a humanistic-based interactive media study programme, which has adopted design in recent years. The specific module is timetabled for the second semester of a master's level interactive digital media course and is titled 'Project Management and Strategic Design' (AAU, 2016, our translation). The module is aimed at making the students competent enough to carry out strategic design considerations as part of their PBL project and manage the project with respect to resources, collaboration and the construction of knowledge. In relation to the progression of their education, the module has a focus that goes beyond the conceptual and into the more detailed design considerations verging on implementation. There is a strong focus on the human

actors, their context and the implications of the designed artefact, as the education has a design-orientation and is located in the Humanistic Faculty.

The study programme for the module has three general objectives in relation to what the student should learn. In the study programme, it is stressed that the student should attain knowledge of strategic design, process management, the theory of science and documentation and communication within the design process (AAU, 2016). Additionally, the students should attain skills within analysis, evaluation and the development of interactive digital products in relation to a set of users and their contexts of use. Finally, the students should attain competences to drive and shape the design process in relation to users and other stakeholders and to reflect scientifically on the product and process together with being able to present a design. The students are required to justify their compliance with these three objectives through a written report and an oral defence, where the report acts as the foundation for the discussion. The student reports must include descriptions of their position on the philosophy of science as well as their applied methods and theories, together with a discussion of their academic contributions.

Within the module, there is a course named BizChange, which consists of lectures on strategic design. Collaboration agreements are made with local companies to ensure that relevant cases are established and that a high level of engagement occurs with the case partners. In such collaborations, the case partner (a local company) provides a case for the student to address, together with context-specific knowledge. The students engage in the case by challenging its boundaries, and exploring the problem and solution space, before eventually coming up with a concept based on strategic design.

The BizChange course runs for four months with some predefined milestones displayed as meetings between the students and their case partners. The purpose of the meetings is related to the expected progression of the students, and they shift their orientation accordingly from 1) establishing alignment and mutual understanding and 2) framing and reframing the problem to 3) conceptualising, before eventually 4) presenting the concept with its strategic dimensions.



*Fig. 1 BizChange runs for four months and resolves in a conference named BizMedia where the students are invited to present their work.*

A total of 15 case partners were involved in the latest iteration of BizChange in 2016. In this paper, we have selected one exemplary critical case (Flyvbjerg, 2006) to highlight and discuss the observed dilemmas through the combination of design and classic humanistic approaches employed in the educational setup. The students are encouraged to engage in the case with a 'research-through-design' approach as a method that enables academic reflections on their designed subject matter, as well as enabling them to critically reflect on the methodological and intuitive choices made towards the 'ultimate particular' of the design (Koskinen et al., 2011). The students, with this approach, often describe their design meetings as serial logic interventions (Krogh, Markussen, & Bang, 2015).

## 4. Student case

A local bank was interested in participating in BizChange with a case concerning the purchasing process for first-time real estate buyers. They held the assumption that many first-time property buyers were uncertain of the purchasing process due to its complexity and dynamics. The bank wanted to change the current experience into a more comfortable experience by taking advantage of digital media's capacities. The proposed case was part of a larger loyalty strategy directed towards establishing a more personal relationship with the bank's customers.

The bank expected the students to cover the buyer's experiences to synthesise the challenges before forming a concept represented through a prototype, which could act as a 'proof of concept' for further development.

The students took on the role of practising designers in collaboration with the bank and applied the Business Model Canvas (Osterwalder & Pigneur, 2010) to better understand the bank, its value proposition and customer relations. To complement this knowledge, the students conducted state-of-the-art competitor mapping, which served as inspiration and as a strategic tool indicating the potential future direction.

The students also applied a user-centred design focus as they conducted 14 interviews to gain insight into how the bank's customers experienced the process of first-time property purchasing. Based on the interviews, the students developed themes such as *'I want to be seen and heard'*, *'I know my adviser'*, *'My bank needs to understand my dreams'* etc. by using a constraint KJ method (Scupin, 1997). Through relating the various insights from these activities, the students developed a more refined notion of the key elements in the case, and *trust*, *loyalty* and *person-to-person interaction in relation to mediated interaction* became the focal points. The focal points were scrutinised through academic literature studies and design activities where the new insights, articulated as well as tacit, were converted into design opportunities and ideas, which through iterative dialogue with the bank were converted into a concept that was prototyped and tested with a small number of users.

## 5. Interwoven, yet separate student contributions

From this short overview of the students' work, it is clear that they practised design with some similarities to their future roles in industry, and that they did so with a research-through-design approach to meet their academic obligations. The students thus had both constructive design activities and an academic perspective to maintain within the project – consequently, the students also had to deliver two outcomes, namely a design outcome (an appropriate fitted solution) and their academic outcome in accordance to the knowledge, skill and competencies goals of the study regulation.

The students' final product involved the design of a high-fidelity website and the supporting system on a conceptual level. For the website design, the students had focused on visualising the process regarding the responsibilities of the involved stakeholders and they had incorporated mechanics that would visualise the progression and the next steps to be taken and by whom. The design received a very positive evaluation in a later user test session as well as from the management in the bank. The bank decided to initiate a cross-disciplinary team for further development and invited the students to take part, and one student agreed to do so.

The students' academic end-result was strongly rooted in their design work and took shape as heuristics for the design of systems – in essence, what Frayling (1993) would label 'research for design'. The students built the heuristics based on deep user analysis, which was discussed and

developed further through the application of relevant literature. The origin of the heuristics was very transparent due to the students' systematic approach as they developed a framework showing the 1) empirical experiences with a theoretical perspective; 2) the design heuristics; and 3) the designed features. For example, the students had detected an area of concern for the interviewed customers concerning the transparency of the process. Here, they framed their empirical experiences as 'We experienced that customers had a need for having the purchasing process visualised and thus have developed an overview of the involved stakeholders and their responsibilities throughout the process.' This was translated into the design heuristic: 'The system must visually represent the process and the involved stakeholders' responsibilities for the given stages.' This materialised into the design features, as described above.

In this sense, it was possible to trace the path of a designed feature to the design heuristics and to the empirical and theoretical underpinnings. This transparency illustrates a process that moves from the experienced world containing the existing knowledge of the field to an abstraction (the design heuristics), before the newly developed knowledge is materialised in features, mechanics and systems. The students thus developed an academic contribution with a set of heuristics, because these heuristics had a format that allowed for a broader implementation into fields with the same characteristics.

## 6. Design as a vehicle for knowledge production

The students, as described in the case above, acted as constructive designers throughout the project with regards to their methodological approach and their constructive product contributions. Furthermore, they acted as researchers by applying research-through-design documents and reflecting upon their design process. The dilemma here is that it is only the latter, namely the academic contribution, which is valued in the context of the university with respect to the governing study plan. Consequently, is the solution, including the constructive design activities and the academic input, not equal in terms of grading evaluation? This means that the design activity in itself is not valued; instead, it is merely a vehicle for the students' academic line of work.

An academic report must be written for the above-described actions, articulated with a strong focus on both the theoretical and methodological considerations as well as the gained knowledge in terms of the subject matter, which was also clear in the described case. There is, without a doubt, valuable learning in reporting one's actions and reflecting upon them, as the students step into the role of reflective practitioners, able not only to reflect-in-action but also to reflect-on-action (Schön, 1983). The idea is that this elevates the students' learning to the level of competences rather than merely to a skill level. Yet the outcome of this process – the product and whether it is an appropriate fit or not – is not assessed as a contribution.

As described above, the students should also develop and disseminate knowledge, which can be methodologically oriented, but it can also be directed towards the subject matter of the specific problem. From the Study Board regulations of the university, this knowledge is framed as an academic contribution, which connotes that the knowledge must meet the standards of a given field of scientific practice. These contributions are valued insofar as they provide analytical reflections. However, this limits the valued aspects to the individual parts, such as empirical and theoretical discussions, leading to the final product and not the synthesis of the sum of the parts that constitutes the 'ultimate particular' (Zimmerman & Forlizzi, 2008) of the product as an equal contribution.



## 7. The dilemma of the academic design student

As described above, the students are meet with both a practical and academic dimensions of the project. These dimensions might be interrelated; however, the institution does not rate them equally. The students' deliverables, together with their ability to reflect upon their actions and engage in a discussion on a professional level, are assessed with respect to the formalities from the study programme (AAU, 2016). The study programme acts as a guiding principle for both the students in their work, and for us, the examiners of the students' work – to be understood in terms of how they have conducted their work and what knowledge they have gained from it in line with the germane theory regarding methodological matters and the subject matter. In this sense, it is the students' actions that are under scrutiny through the written report and oral performance at the examination table. This is undoubtedly relevant, as it encourages the students to reflect on both their choices and their performance. However, the product or the result of the students' constructive design effort is not valued and thus does not affect how the students are graded. This is despite Cross (1999) having argued that research knowledge resides in the artefact, at least as a point of departure, and that this is an epistemological step for designers to qualify that knowledge. With this in mind, the dilemma of academic institutions' – and specifically the study regulations' – disregard for the ultimate particular becomes even more puzzling. The humanities, as an example, value the localised 'truths' of the individual subject (Dilthey & Betanzos, 1988) and see 'the particular' as a deep analytical dive into the human condition. This does not seem that far away from the product synthesis of the designed artefacts. Why is it so hard then to align the product as a vital academic contribution? And what types of design knowledge can be identified?

## 8. Initial conclusion: A designerly paradigm

One of the oft-repeated problems within design research is the question of describing design as its own independent research paradigm (Gaver, 2012). Cross (1982) pointed out in the early 1980s that design was caught between the classic fields of natural sciences and the humanities. This distinction essentially draws its line back to Dilthey's division between the natural sciences' study of observed natural phenomena and their relation to other phenomena, and the humanities interpretative studies of thoughts, feelings and experiences (Dilthey & Betanzos, 1988). Of the two macro fields of science, Cross (1982) argued that design had both its own ontology and epistemology, viewing design as being concerned with all man-made phenomena. This notion has been backed by, among others, Buchanan (2001), regarding the notion of design as being concerned with the synthesis of 'products', but also points back to Simon's (1996) archetypical description of design as the 'science of the artificial'. Thus, the now near-omnipresent term 'design thinking' is rooted in this ontology of the man-made and is also separated from engineering as it is concerned with the world as it 'could be'. However, what is perhaps inherent in this perspective is its inclination towards seeing engineering design as being more closely related to the causal explanations of natural science and human-centred design as mostly related to the interpretive and experiential studies of the humanities. The humanistic root of design is further supported by both Buchanan's (1992) oft-quoted paper on wicked problems where design is framed as 'a new liberal art of technological culture'. Likewise, Kolko (2011) argued for constructive design as a liberal art, insofar as in a modern technological landscape, the planning and shaping of user experiences are in line with earlier critical reflections found in the arts and aesthetic studies.

Krogh et al. (2015) and Koskinen et al. (2011) have pointed to design research being concerned with the instantiation of an 'experiment'. That is, an active intervention forming a product synthesis of the

world as it could be. While not as strict or formal as the rational positivistic experiments of the natural sciences, Krogh et al. (2015) describe a number of both convergent and divergent logics framing construction as experiments. This is widely different from the classic studies of the humanities, which emphasise critical, comparative and historical analyses to form a reflective interpretation of its phenomena. The experiment, the empirical driver for the natural sciences, has historically not had a significant role in the humanities. Buchanan (2001) noted that up until a few decades ago, the humanities only focus on the constructive side of design was to study the literacy and aesthetics in the (designed) tangible products of arts and crafts as the subject matter. It is only in recent decades with the emergence of design and its epistemological and ontological kinship with the humanities that the constructive activities of product synthesis have found their way into the humanities as an area of interest. Here, its emphasis on experimental acting upon the world challenges the classic analytical modus of the humanities, not just by aiming to interpret and understand, but also, with an apparent nod to Marx (in Marx & Engels, 1998), also changing the conditions of the human experience it studies. The classic humanistic inquiry paradigm is at odds with the application and appropriate fit paradigm found in design (Owen, 2006). The way forward could be to acknowledge both and further specify types of design-knowledge contributions.

Even though its values are aligned with those of the humanities, can we then reasonably claim that design contributes to the knowledge contributions associated with the humanities? And furthermore, in the changing academic landscape of increasing cross-disciplinary research and education, how can the knowledge contributions from one field be supported, extended or assessed differently with the addition of design?

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